

CLAIMS

1. A transmitter apparatus for performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method, said transmitter apparatus being characterized by comprising;  
an interleaver for generating interleave-processed data being obtained by performing specified rearrangement processes on frequency domain data to which said data symbols are converted and  
an IFFT processing part for converting said interleave-processed data to time domain signals.
2. A transmitter apparatus according to claim 1, being characterized by further comprising an FFT processing part for converting said data symbols to said frequency domain data.
3. A transmitter apparatus according to claim 1 or 2, being characterized in that said interleaver generates and outputs N pieces of data from Q ( $N > Q$ ) data symbols inputted.
4. A transmitter apparatus according to one of claims 1 to 3, being characterized in that said FFT processing part performs Q-point FFT processes on Q data symbols inputted.
5. A transmitter apparatus according to one of claims 1 to 4, being characterized in that said IFFT processing part performs N-point IFFT processes on N pieces of data outputted from said interleaver.
6. A transmitter apparatus according to one of claims 1 to

5, being characterized in that;

said interleaver is provided with an interleaver memory for storing output data of said FFT processing part,

data of Q points outputted from said FFT processing part are written into specified positions in said interleaver memory, and

specified N pieces of data including Q pieces of data written into said specified positions and data written into other positions than the positions into which said Q pieces of data are written are read from said interleaver.

7. A transmitter apparatus according to one of claims 1 to 6, being characterized in that specified N pieces of data read from said interleaver memory are outputted to said IFFT processing part.

8. A transmitter apparatus according to one of claims 1 to 7, being characterized in that data symbols of said specified transmission method are spread signals (including the case of spreading rate of 1).

9. A transmitter apparatus according to one of claims 1, 3, 5 and 6, being characterized in that data symbols of said specified transmission method are multi-carrier signals.

10. A transmitter apparatus according to one of claims 1, 3, 5 and 6, being characterized in that data symbols of said specified transmission method are OFDM signals.

11. A transmitter apparatus according to one of claims 1 to 10, being characterized in that data symbols of said specified transmission method are data symbols of variable

data rate.

12. A communication system comprising;

a transmitter apparatus for performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method and

a receiver apparatus for restoring said data symbols on the basis of the received reception signals obtained by receiving said transmission signals, being characterized in that;

said transmitter apparatus comprises

an interleaver for generating interleave-processed data being obtained by performing specified rearrangement processes on frequency domain data to which said data symbols are converted and

an IFFT processing part for converting said interleave-processed data to time domain signals, and

said receiver apparatus comprises

an FFT processing part for converting time domain signals to frequency domain data and

a de-interleaver for generating de-interleave-processed data being obtained by performing specified rearrangement processes on said converted frequency domain data.

13. A communication system according to claim 12, being characterized in that;

said transmitter apparatus further comprises an FFT processing part for converting said data symbols to said frequency domain data, and

said receiver apparatus further comprises an IFFT processing part for converting said de-interleave-processed data to time domain signals.

14. A communication system according to claim 12 or 13, being characterized in that said de-interleaver generates and outputs  $Q$  pieces of data from  $N$  ( $Q < N$ ) pieces of data inputted.

15. A communication system according to one of claims 12 to 14, being characterized in that said FFT processing part of said receiver apparatus performs  $N$ -point FFT processes on  $N$  pieces of reception data which have been received and converted from serial to parallel.

16. A communication system according to one of claims 12 to 15, being characterized in that said IFFT processing part of said receiver apparatus performs  $Q$ -point IFFT processes on  $Q$  pieces of rearrangement-processed data outputted from said de-interleaver.

17. A communication system according to one of claims 12 to 16, being characterized in that said de-interleaver is provided with a de-interleaver memory for storing output data of the FFT processing part of said receiver apparatus, data of  $N$  points outputted from the FFT processing part of said receiver apparatus are written into specified positions in said de-interleaver memory, and

$Q$  pieces of data written into specified positions as data to be processed out of  $N$  pieces of data written into said specified positions are read from said de-interleaver.

18. A communication system according to one of claims 12 to 17, being characterized in that specified Q pieces of data read from said de-interleaver memory are outputted to said IFFT processing part of said receiver apparatus.

19. A communication system according to one of claims 12 to 18, being characterized in that data symbols of said specified transmission method are spread signals (including the case of spreading rate of 1).

20. A communication system according to one of claims 12, 14, 15 and 17, being characterized in that data symbols of said specified transmission method are multi-carrier signals.

21. A communication system according to one of claims 12, 14, 15 and 17, being characterized in that data symbols of said specified transmission method are OFDM signals.

22. A communication method being a transmission method for performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method, said communication method being characterized by comprising;

an FFT processing step for converting said data symbols to frequency domain data,

an interleave-processing step of performing rearrangement processes on said converted frequency domain data, and

an IFFT processing step of converting said frequency domain data to time domain signals.

23. A communication method according to claim 22, being characterized in that said interleave-processing step generates and outputs N pieces of data from Q ( $N > Q$ ) data symbols inputted.

24. A communication method comprising;

- a transmission step of performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method and

- a reception step of receiving transmission signals transmitted by said transmission step and restoring said data symbols, said method being characterized in that;

- said transmission step comprises

- an FFT processing step of converting said data symbols to frequency domain data,

- an interleave-processing step of performing interleave processes on said converted frequency domain data and

- an IFFT processing step of converting said frequency domain data to time domain signals, and

- said reception step comprises

- an FFT processing step of converting said time domain signals to frequency domain data,

- a de-interleave-processing step of performing rearrangement processes on said converted frequency domain data and

- an IFFT processing step of converting said frequency domain data to time domain signals.

25. A communication method according to claim 24, being

characterized in that;

said interleave-processing step generates and outputs N pieces of data from Q ( $N > Q$ ) data symbols inputted and

said de-interleave-processing step generates and outputs Q pieces of data from N ( $Q < N$ ) pieces of data inputted.